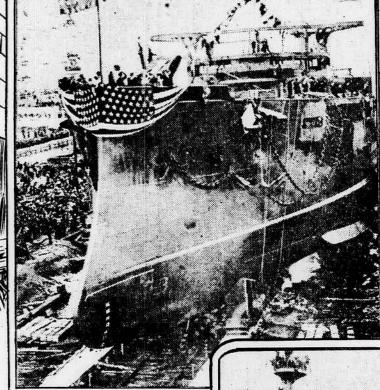


Adding Battleships to Our Navy Is a Task of Magnitude - About Three Years Is Required 

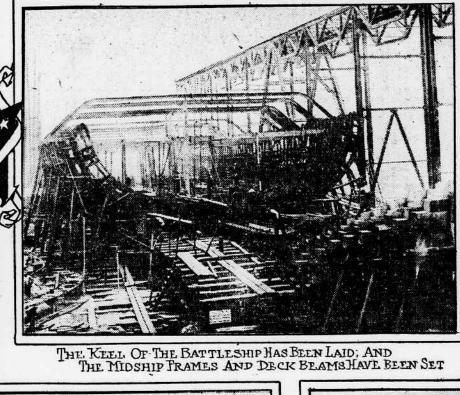


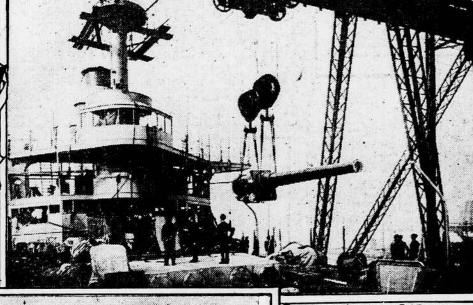
The Hull Is Nearly Com-PLETED, This Is Launching Day

standard plans, making the inspection less exacting and disregarding the expense of rushing contracts for material and the cost of skilled labor for extra shifts of workmen.

The adoption of standard plans has been tried twice since the beginning of the new navy and has not proved satisfactory. Such a system is attractive. It would give a fleet of homogeneous vessels, and Congress would know each year exactly what was meant by battleships; the yards would adjust resources to their production, and there would be no delay in preparing new plans or on the part of the builders in making their bids.

The difficulty encountered is that there would be no progress in ship designing, which would be all right for us if we happened to adopt the best type and other nations would agree not to improve upon it. Since they are always adding something—size, speed, better armor or heavier guns—we have the outsing thousand miscellaneous minor table.





HE GUNS AND PUT IN PLACE AND THE TURRETS ARE THEN COMPLETED

hand bars, although some plants are using hydraulic or other power, around these dogs until they correspond exactly with the templates. The plates for the frames are cut into shape by great shears, following the template with almost the same ease that a tailor cuts cloth for a pair of trousers after a paper pattern.

ADMIRAL DAVID U.SN. WATSON CHIEF

The angles and plates are assembled lished principles; the engines were the and riveted together into the great result of careful calculation, and their frames ready for the traveling crane designs had to pass the approval of to come along and carry them to the the bureau of steam engineering. The proper place on the ship's body. Some builder, who is under bond in a heavy of these frames are ninety feet across penalty to complete the ship, could not and fifty feet deep. When all the have received the contract unless he

and fifty feet deep. When all the frames are in position on the keel the outline of the hull is distinguishable.

The bulkheads, which divide the ship into various watertight compartments, are built up in the same manner, and the plates (not armor) for the bottoms and sides are also cut after templates made in the molding room, each being cut to fit its particular place.

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The bulkheads, which divide the ship into various watertight compartments, are built up in the same manner, and the plates (not armor) for the bottoms and sides are also cut after templates that the president of the Union iron works of San Francisco informed his directors that they might expect no direct profits from the first battleship contract; for cost what it would, he would turn out a perfect

eting, which is now begun to build them fast to the keel.

The side and bottom plates are cut by shears to the exact size necessary, and most of them rolled into the shape required to fit the curve of the boat. This is done by resting the plate upon two heavy parallel rollers, while a third is forced down upon the plate. The rollers are revolved, and by regulating the pressure of the upper one the plate is given the desired curve.

The plates vary greatly in size, but some are twenty-five feet long and ten feet wide, from % to 1% inches thick and weigh 6.000 pounds apiece. Their edges are run under heavy machinery which punches out clean holes for the rivets which fasten them in place on the sides or the bottom of the ship.

As soon as the frames have been completely riveted in place the side plates are brought to their positions in rows, called strakes; and after being bolted in place are riveted fast in their position—being built into the ship.

All battleships are built with double

their position—being built into the ship.

All battleships are built with double bottoms; the inner being several feet from the outer; but how this space is treated no orthodox builder will disclose. Some of it is utilized for carrying oil fuel and various devices are placed therein to make the hull proof against torpedoes. As long as the inner shell remains intact the ship cannot sink through injury to the outer hull from collision or explosion.

In the same manner that the frames are assembled and riveted together, the builkneads which divide the ship into compartments are assembled and then built into their place in the ship. By this time the hull has taken shape, although it is not yet ready for launching.

the firerooms and the enormous boilers with their fire boxes are put in place and secured. At this time the barbette and the diagonal armor are usually set up. The barbettes, which are made of armor steel, so tempered that only the hardest tools will touch it, are really hollow cylinders running from the protective deck at the waterline level to a height a few feet above the upper deck. The balanced turrets revolve within

the barbette, which protects their gear; and ammunition for the guns is passed up from the ammunition room at the base of the barbette.

and ammunition for the guns is passed up from the ammunition room at the base of the barbette.

The diagonal armor runs from the extremes of the side armor belt toward the center line of the ship; and all the armor, when in place, forms a steel fortress impenetrable to all but the most powerful projectiles and a protection to the vitals, i.e., the engine rooms and magazines of the ships.

When all this work is done the ship, which is now about half completed, is ready for the launching, and about fourteen months have elapsed from the time her keel was laid.

As soon as she has gone overboard and been tied up at her berth the work continues. If the construction has been well timed and done according to contract, the engines are ready and their installation is begun at once. The decks are laid, and the work of piping, ventilating and wiring is carried on as rapidly as possible. At this time about 1,200 artisans are usually engaged on the multifarious details of completion.

The government provides the armor, but the builder must put it in place. As it is impossible to bend these plates, which weigh perhaps 80,000 pounds, a wood filling is cut to exactly fit the sides of the ship and so adjusted and trimmed that the surface of the armor is left even throughout. In some of the latest ships cement backing has been substituted for wood.

Meantime the department furnishes and puts in place guns, torpedo tubes and the rest of her armament. As many men as can work to advantage are engaged in doing the thousand details which have not been mentioned, and at last, when the ship is about 95 per cent completed, she has her trial trips.

It is practically certain that she will be successful; for from the day the first stroke is taken nothing is left to chance. The design was the result of long study and based upon well estab-

THE SHIP IS PLACED IN COMMIS-

SION: HER CREW AT QUARTERS AND OFFICERS AT SALUTE AS

The Colors Arehauled Up

question why the period from authori-

shelping and living quarters for always adors sometime, without trouble to the stream or or heavier runs—we have to meet and, if possible, seed their latest types. As an instance of that de-vice personal time is estimated that the new personal time is settled that the new personal time is settled to the stream or or heavier runs—we have seed their latest types. As an instance of that de-vice personal time is estimated that the new personal time is estimated that the new personal time is settled to the stream of the

## Reconstructs Fossils a Hundred Million Years Old for the Government

M ISS FRANCES WIESER, as a Paleontologic Draftsman in the United States Geological Survey, Is Doing Unique Work. Much of Her Drawing Is Done Under a Microscope — Accuracy Is Essential-Her Work With Dr. Walcott-Investigations of the Scientists in Pictured Form-Specimens for Museums.

woman ensconced in a window embrasure, with microscope to eye, Miss Wieser was born with a love of

Hould one, in traversing the facsimiles of the creatures which, then she will assemble the various acons ago, occupied this earth of ours.

Selentific bureau, come upon a selentific bureau, come upon a perfectly complete fossil form.

making fine, steady, but rapid lines on paper, it might be that that woman early childhood. She is the daughter small stone curlicue having actually was Miss Frances Wieser, paleonto- of the late Louis Wieser, a portrait been a living, breathing animal fifty logic draftsman for the United States painter, who, graduating in his art million or more years ago, she will geological survey. Miss Welser's is one of the unusual and, indeed, unique this country, which offered a wider field ancient horseshoe crablike animal—



men. To the uninitiated eye this accumulation of foreign material would seem to be part of the specimen, and would appear in the picture if made by one less skilled. It takes the greatest skill and care to eliminate all such blemishes, and Miss Wieser's expert knowledge makes her work absolutely reliable.

"Another difficult thing in the illustration of fossilis is the restoration of parts which are missing. For example, in the extinct tribolites, which are the far-distant ancestors of the modern crabs and lobsters, entire specimens are seldom found, and it is only by reassembling all the parts of individuals as they occur in fragments in the rock that a drawing showing the animal as it existed in nature can be secured.

"In her work in the survey for many years, when she has illustrated the monographs of Charles D. Walcott, formerly director of the United States geological survey, now secretary of the Smithsonian Institution, Miss Wieser's the content of Cambrian Brachionoda; perhaps if the survey for many years, when she has illustrated the Smithsonian Institution, Miss Wieser's interest in the science in which she is a valuable aid does not won her meed of praise from the Geological Magazine of England Awich, in the survey read that a frist credit in the following between the following between the far-distant ancestors of the modern crabs and lobsters, entire specimens are seldom found, and it is only by reassembling all the parts of individuals as they occur in fragments in the rock that a drawing showing the animal as it extended review of the work, gave the artist credit in the survey for many years, when she has illustrated the monographs of Charles D. Walcott, formerly director of the United States geological survey, now secretary of the Smithsonian Institution, Miss Wieser's interest in the science in which seems a flustration of praise from the Geological survey, and they have it of the work in the pressure of the work is a survey. The plates are the evidence of her fail work. They are; it is not only the great changes which the have undergone since that time.

served in stone. Miss Wieser was found to be adapted to drawing the structure of these very obscure forms and this led to her selection by Dr. Walcott to illustrate his several large monographs upon them. The result of Dr. Walcott's studies, with Miss Wieser's work has also covered this and other countries. She has magnof the strata of the strata of this and other countries. She has magnof the strata of this and other countries. She has magnof the strata of the strata

"Most of her work, especially of late, has been upon fossils of Cambrian forms, which include the oldest known shells in the world. The word Cambrian is the geologic name for this very ancient formation because the rocks were first studied in Wales. The researches of Dr. Walcott have shown they now answer to the euphonique.

In recognition of her careful and artistic work, so valuable an adjunct to the work of the investigator, one scientist has named some of his new specimens in honor of the woman who has presented their beauties to the world. They are early specimens of searches of Dr. Walcott have shown they now answer to the euphonique.

The armor plate people, the sould recognition of her careful and artistic work, so valuable an adjunct to the work said the man, with a wink, but not the one with the pretty considered the oldest known specimens in honor of the woman who has presented their beauties to the world. They are early specimens of paredness and armor plate. searches of Dr. Walcott have shown they now answer to the euphonious "The armor plate people," he said, them to exist in many parts of the title of Sceptropora Francisca. Two "have threatened that if the govern-North American continent and to con- other government officials have com- ment establishes a national armor plate tain abundant animal life now pre- memorated her name in the very plant they will shut up their own

'Garn!' said the policeman. 'More'n In recognition of her careful and twenty buses as gone by since you've been waitin' ere.

"I know, said the man, with a wink,